Legislative Audit Division

State of Montana

Report to the Legislature

March 1998

Performance Audit Report

Construction Contract Administration

Montana Department of Transportation

This report contains information on the controls related to the Construction Contract Administration process for highway construction projects. Recommendations in this report address improving process efficiency.

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March 1998

The Legislative Audit Committee
of the Montana State Legislature:

This is our performance audit of the Construction Contract Administration process administered by the Montana Department of Transportation.

This report contains information on potential audit areas and recommendations for improving the process. Responses from the Department of Transportation are contained at the end of the report.

We wish to express our appreciation to the staff of the Construction Bureau and the districts for their cooperation and assistance.

Respectfully submitted,

"Signature on File"

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Legislative Audit Division

Performance Audit

Construction Contract Administration

Montana Department of Transportation

Members of the audit staff involved in this audit were Angie Grove, Joe F. Murray, and Jim Nelson.

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Appointed and Administrative Officials

			Term Expires in January
Transportation Commission	Thorm Forseth, Chairman	Billings	2001
	Ed Smith, Vice Chairman	Dagmar	1999
	Dan Larson	Libby	1999
	Patricia Abelin	Bozeman	2001
	Robert McKenna	Helena	2001

Department of Transportation	Marvin Dye, Director
	Jim Currie, Chief of Staff
	Gary Gilmore, Chief Engineer, Engineering Services
	Bob Tholt, Bureau Chief, Construction Bureau
District Administrators	Bruce Barrett, District Administrator, Billings
	Jason Giard, District Administrator, Butte
	Gene Stettler, District Administrator, Great Falls
	Jim Weaver, District Administrator, Missoula
	Mick Johnson, District Administrator, Glendive

Introduction

A performance audit of the highway Construction Contract Administration (CCA) process was requested by the Montana Department of Transportation (MDT) and approved by the Legislative Audit Committee. The CCA process is administered primarily by the Construction Bureau within the Engineering Division at MDT. Our audit work focused on examining the process after construction contracts are awarded. Areas of review included contract monitoring, project inspections, review and approval of contractor payments, and the reporting structure between district and central office personnel.

What is CCA?

The CCA process is generally the procedures followed by MDT staff to monitor highway construction contracts. Highway construction is achieved by contracting with private contractors to complete designated projects. Department contract monitoring involves activities to verify contractors follow established specifications and ensure work completed meets designated quality standards. These Standard Specifications outline department expectations of contractors when constructing federal and state highways. These Specifications define the method of payment, basis of payment, responsibilities of the contractor, duties of department staff, specifications for materials used, and construction details. Extensive guidelines are included for quality assurance and quality control measures for ensuring overall product quality and standards.

Overall the CCA Program is Operating as Intended

Overall, we found the CCA process is a very complex process devoted to monitoring and administering the highway construction program. We found this process is working as intended and does provide a quality control function over the construction of state highways. Although there are several recommendations highlighted in this report, in general we found the process to be operating consistently within department policies and achieving the general mission of the department.

Report Summary

Conclusion: Controls Over Measurement and Payment are in Place

One of the major areas of the CCA process is controlling measurement and payment of contract quantities, as prescribed in the Standard Specifications and applicable department policies. Based on our work in this area, we conclude there are adequate controls over the payment and measurement process for CCA activities. There are established procedures for staff to follow, supporting documentation is developed for all contract items, and key areas within the process have independent supervisory review. These controls provide assurance the process is consistent statewide.

Conclusion: Quality Control Procedures are in Place

Department Standard Specifications are to be applied to all CCA contracts across the state and should be consistently followed by all MDT staff and contractors. Initial interviews with department management personnel and contractors indicated these standards may not be followed consistently. To verify these potential inconsistencies, we interviewed staff in all five districts relative to CCA operations. In addition, we examined project files in field offices and district offices to highlight any areas of inconsistency. We concluded the department has established a formal quality control system for monitoring compliance with its Standard Specifications. Controls are in place both at the district level and at the Construction Bureau in Helena. These controls are working to ensure statewide consistency with designated standards.

Areas Where Controls Could Be Strengthened

Throughout the course of this audit, we did identify some areas where improvements could be made to the existing controls to strengthen the process. The suggested recommendations in the report address the following areas:

1. Evaluate CCA managers' performance.
2. Develop a formal field office manual.
3. Eliminate unnecessary CCA paperwork.
4. Evaluate the need for the formal partnering process.
5. Either eliminate, or fully implement, the current change order policy.

By addressing these areas, the department would improve CCA communications and process efficiencies.

Alternative Approaches to CCA

We found some steps of the CCA process could be reduced if the department developed a quality assurance strategy rather than a quality control approach for projects with fewer risks. One possible alternative approach would be to try decreasing on-site monitoring by CCA staff for some low risk projects, such as one lift overlays or simple bridge projects. This would require shifting more quality control requirements to the contractor. A risk analysis of projects could be completed to categorize projects which may require less project monitoring to document quantities and to ensure project quality. The department could take steps to assess the level of construction project monitoring needed to minimize risks to public safety but also achieve cost savings. Good management practice dictates on-going evaluation of established processes to identify any potential efficiencies and cost savings.

Organizational Changes Needed

The existing organizational structure does not correspond to the control system and procedures established for the CCA process. The clearer the line of authority from top management to staff, the more effective decision making and communication will be for the whole organization. Currently, district staff rely on the Construction Bureau Chief to make tough program and management decisions. Policy development and statewide development of program issues, such as staff training or clarifying standards, often go unaddressed due to other priorities. This raises questions related to the role of the bureau in relation to the districts and what duties are necessary at the central office level. The amount of central control needed and where those functions should be performed is an area department management should address to effectively use the department's resources and to create a more efficient CCA process.

Chapter I - Introduction

Introduction

A performance audit of the highway Construction Contract Administration (CCA) process was requested by the Montana Department of Transportation (MDT) and approved by the Legislative Audit Committee. The CCA process is administered primarily by the Construction Bureau within the Engineering Division at MDT. Our audit work focused on examining the process after the construction contracts have been awarded. Areas of review included contract monitoring, project inspections, review and approval of contractor payments, and reporting structure between district and central office personnel.

Audit Objectives

Preliminary audit work on the contract administration process indicated controls were in place. We found the process has a defined system of controls and comprehensive written policies and procedures. Based on this information, audit work focused on determining consistency with established procedures and effectiveness of controls across the state. Preliminary audit work also indicated some steps of the process could be strengthened. Therefore, we developed the following questions as our audit scope:

1. Are management controls in place to ensure the process is generally consistent statewide?

2. Are all steps of the CCA process necessary?

3. Are changes needed in the organizational structure for CCA?

Audit Scope and Methodology

Our review examined the process followed after a contract has been awarded. Project design and contract bid processes were not examined. The audit objectives were addressed by conducting testing in the following areas:

- Reviewed 25 construction project files at different phases of completion.
- Obtained input from Transportation Commission members.
- Interviewed department management staff.
- Visited all district offices and interviewed MDT field staff.
- Reviewed contract specifications and process manuals.
- Met with applicable federal officials.
- Met with Montana Contractors' Association officials.
- Interviewed ten different contractors around the state.

-- Identified major computer systems used and interviewed programming staff.
-- Reviewed job descriptions for key staff.

To obtain an understanding of the process, ten construction sites were visited. Projects were visited at various phases of completion including start up, partial completion, and final inspection. Field staff such as hot-plant inspectors, office staff, and project managers were interviewed and observed throughout the process. We conducted 52 interviews of district and field staff including:

-- Five District Administrators.
-- Seven District Construction Supervisors.
-- Thirty-five project managers.
-- Five Office Engineers.

To examine communication methods with contractors, we attended pre-construction conferences, partnering meetings, and impromptu discussions between contractors and department staff.

Process documentation was reviewed to determine if field and district paperwork was comparable to documentation submitted for final payment review in Helena. Progress estimates used to record contractor payments were examined to identify controls that ensure data accuracy. Testing of computer systems was not conducted at this time, although several limitations were noted during our review. This area is discussed further in Issues for Further Study.

This audit was conducted in accordance with governmental auditing standards for performance audits.

Issues for Further Study

During the course of this audit, we identified several areas within MDT to be considered for further study. The following sections discuss these areas and our potential concerns.

Maintenance versus Construction

Both Maintenance Division and Engineering Division staff, which are separate department functions, are involved in state-funded highway projects. Department procedures and specifications for the two functions vary, including guidelines for quality assurance and safety issues. These type of issues have contributed to contractors' perception of administrative inconsistencies across the state. Potential audit scope could focus on the criteria used for assigning projects between the two functions and comparing the two processes to highlight any potential sharing of resources.

Preconstruction Process

During our review, several questions arose related to the preconstruction process, such as project design, right-of-way processes, and transportation planning. Specific questions raised were:

-- How are construction concerns communicated back to department design staff?
-- How are construction projects selected and prioritized?
-- What impacts the timeliness of designing projects?

Future audit work could examine the preconstruction process to address these questions.

Computer Systems

The construction process is a fairly automated process with multiple data processing systems used to compile critical program data. Applicable systems include the Progress Estimates system, the Quality Assurance system, and the Change Order system. Data is entered by various field personnel across the state and downloaded or uploaded through district offices. We identified potential weaknesses in system development and procedural controls. For example, programming staff do not have data definitions or a list of system edits for some of these critical program systems. Operation manuals and system instructions were not available for field staff. Although only limited testing was done in this area, we did not identify weaknesses in input or processing controls. Further work could focus on addressing these limitations and ensuring data accuracy.

Report Organization

This report is organized into five chapters. Chapter II contains general background on the CCA process. Chapters III and IV outline suggestions for improving the process and potential areas of increased efficiency. Chapter V discusses potential changes to the quality control system and organizational structure for CCA.

Chapter II - Background

Introduction

The Construction Contract Administration (CCA) process is administered by the Montana Department of Transportation (MDT). This process is designed to monitor and oversee all aspects of highway construction contracts. Various groups are involved in this process including: the Montana Contractors' Association, the Federal Highway Administration (FHWA), and the Montana Transportation Commission. This chapter describes the general CCA process followed by department staff and the roles of the involved groups.

Highway Construction Contract Administration

According to section 60-1-102, MCA, the Department of Transportation is designated the custodian of the federal-aid and state highway systems. General powers outlined in statute include planning, altering, constructing, reconstructing, and improving state and federal highways. Department officials have a goal to construct safe, cost-effective highway improvement projects, while fully utilizing all available federal funding.

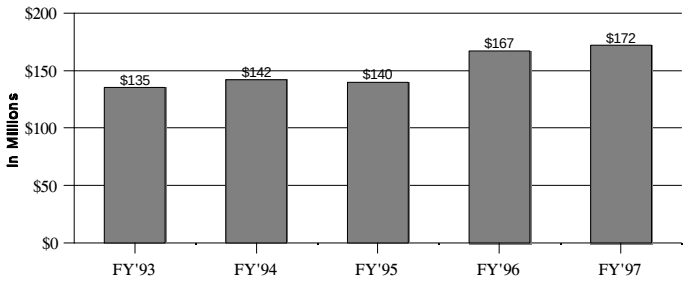
Highway construction is achieved by contracting with private contractors to complete designated projects. This is one of the largest state programs. Department direct construction costs and CCA expenditures for fiscal year 1996-97 include:

-- Payments to contractors of approximately $168 million.
-- Equipment costs of approximately $400,000.
-- Personnel service costs of approximately $13 million.

The following figure illustrates the amount of contractor payments for the past five fiscal years.

Figure 1

Contractor Construction Payments
Fiscal Years 1993 through 1997



Source: Compiled by the Legislative Audit Division from MDT records.

State Standard Specifications for highway construction have been developed by MDT based on guidelines developed by the FHWA with input from highway construction contractors. These standards outline department expectations of contractors when constructing federal and state highways. These standards define the method of payment, basis of payment, responsibilities of the contractor, duties of department staff, specifications for materials used, and construction details. Extensive guidelines are included for quality assurance and quality control measures for ensuring overall product quality and standards.

The CCA process is the procedures followed by department staff to monitor highway construction contracts. Department contract monitoring involves activities to verify contractors follow established specifications and ensure work completed meets designated quality standards. Construction contract monitoring, as handled by the department, is different than monitoring for other types of state contracts. Traditionally the department is directly involved in many of the actual construction procedures including:

- -- Surveying and staking for the highway project.
- -- Inspecting and testing earthwork, grading, paving, and bridges.
- -- Coordinating with other agencies, utility companies, and landowners.
- -- Reviewing and interpreting plans and specifications.
- -- Documenting contract quantities.
- -- Preparing payment estimates.
- -- Preparing or reviewing change orders.
- -- Monitoring compliance with the Davis-Bacon Act which requires contractors pay prevailing wages, Equal Employment Opportunity requirements, environmental regulations, etc.

A general goal for state highway construction operations is to maintain department CCA costs of less than 10 percent of contract awards. MDT construction administration costs are consistently at or less than the 10 percent goal.

Types of Construction Projects

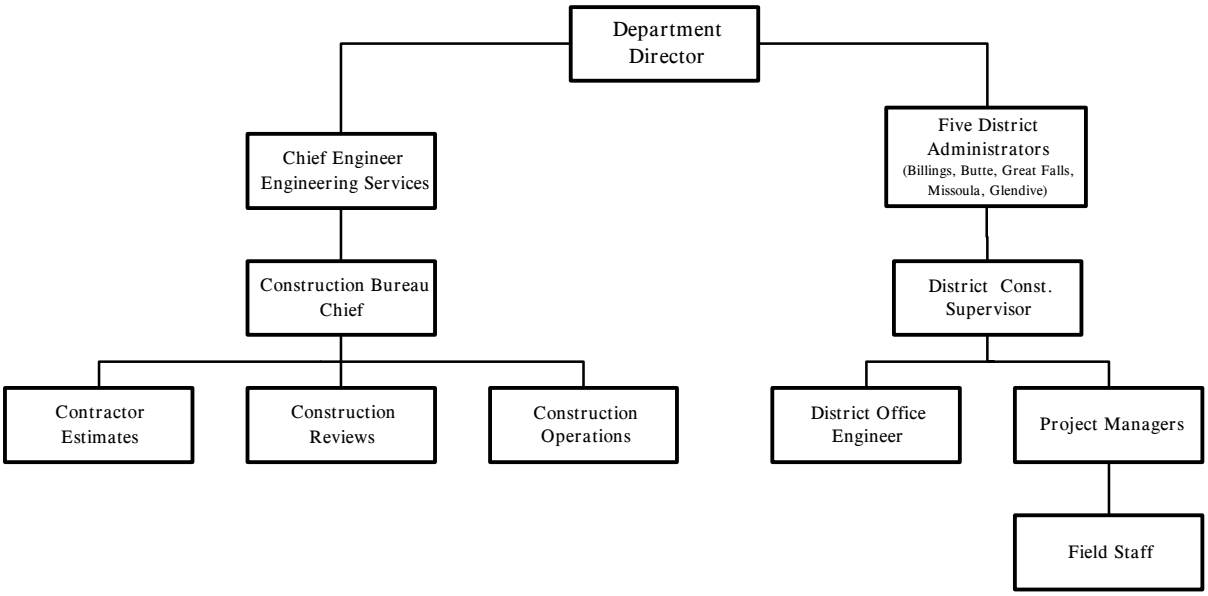
Highway construction projects include a wide range of construction activities. Construction can include building bridges, rest areas, re-constructing existing highways, and construction of new roadways. Projects can include earthwork, surfacing, installing guardrails and curbs, constructing retaining walls, and installing culverts. Administering these projects can encompass many areas such as right-of-way, utility relocation, and storm water permits. Each of these areas must be planned for and monitored during the CCA process.

Department CCA Organization

CCA functions are primarily carried out by Construction Bureau staff and department staff located within five regional districts located across the state. There were approximately 229 FTE allocated to the CCA program in fiscal year 1996-97. These FTE are allocated throughout the department to perform various CCA duties. The following figure illustrates the organizational structure of the department's construction staff.

Figure 2

Organizational Structure of MDT Construction Staff



Source: Compiled by the Legislative Audit Division from MDT records.

Helena Construction Bureau

Although final technical oversight is the responsibility of the division administrator who is the designated Chief Engineer, day-to-day construction activities are coordinated by staff within the Construction Bureau in the Engineering Division at MDT. There are 19 bureau staff involved in the CCA process which begins after construction contracts are awarded. CCA duties are assigned to three sections within the Construction Bureau: Construction Reviews; Contractor Estimates; and Construction Operations.

The Construction Reviews section is responsible for ensuring uniformity between districts and monitoring consistency with state Standard Specifications. This section has three construction reviewers who focus on quality assurance testing of materials and construction activities. In addition, there is a bridge inspector responsible for providing technical assistance statewide for all

bridge projects and one FTE devoted to evaluating compliance with environmental regulations. Other duties addressed by staff in this section include reviewing design plans and discussing contract changes with applicable district staff.

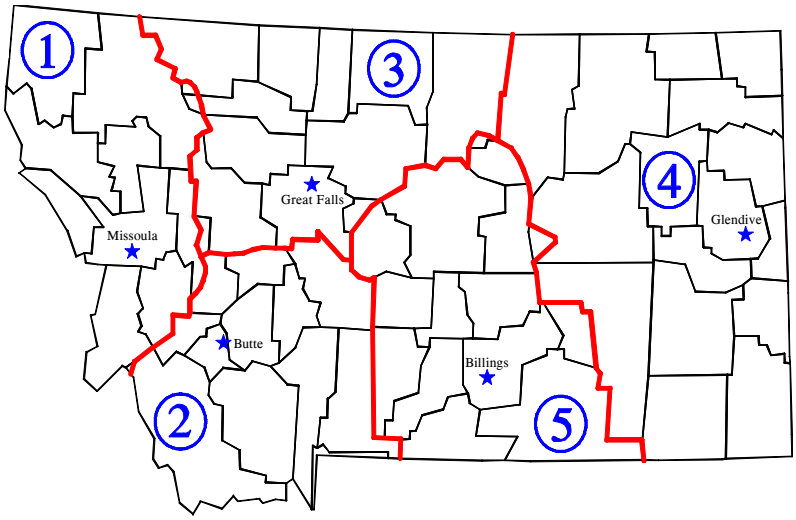
The Contractor Estimates section is responsible for processing progress estimates submitted by field staff for tracking and billing quantity and payment amounts. This section generates the monthly payments sent to the contractors. Staff in this section are responsible for conducting spot checks and random reviews on district calculations for material quantities on all projects prior to final payment on a finished project. Three staff and a section supervisor focus on various specialized aspects of the projects to ensure all data is complete and accurate. Other duties include tracking the fuel price changes to determine if adjustments (increases or decreases) should be made to the fuel rate noted in the contract and tracking contract modifications.

The Construction Operations section includes five FTE who perform various program planning and program support functions. Staff are responsible for tracking all construction equipment inventory, providing system support for the Contract Management System, tracking change orders, reviewing subcontracts, and developing standard specifications.

Transportation Districts

The department organizational structure includes five districts which are spread geographically throughout the state. District offices are located in Missoula, Butte, Great Falls, Glendive, and Billings. The following map illustrates each of the districts.

Figure 3
Montana Transportation Districts



Source: Montana Department of Transportation Records.

District CCA staff include district administrators, construction supervisors, office engineers, project managers, and field staff. District administrators within each of these offices are responsible for overseeing transportation functions within their districts, including oversight of construction projects. District construction duties are performed by district construction supervisors, project managers, and field crews. District construction supervisors direct all project managers and are the primary source of advice on construction problems. They administer the district construction budget and monitor the use of district manpower. Their construction responsibilities include:

-- Assigning staff and equipment to projects.
-- Conducting post-grading and pre-completion project inspections.
-- Approving change orders (up to an established dollar limit).
-- Reviewing and recommending resolution of contractor claims.
-- Recommending assessment of liquidated damages.

District office engineers are responsible for submitting monthly progress estimates to the Construction Bureau for payment and reviewing all project documentation to ensure consistency with department guidelines. Other duties include operation and technical assistance of computerized systems and independent review of field calculations.

Project managers within each district administer one or more on-going highway construction projects. Their duties involve:

-- Supervising engineering surveys.
-- Evaluating and assessing contract time.
-- Interpreting plans and specifications.
-- Preparing estimates for contractor payment.
-- Initiating and preparing contract change orders and extra work orders.
-- Inspecting contractors' work on projects.
-- Reviewing traffic control plans.
-- Evaluating and documenting compliance with contract requirements.

Each CCA project manager is assisted by a field crew of technicians to perform office, surveying, inspecting, and testing duties. The size and make-up of each crew varies according to the type and size of the assigned projects. These crews are supervised in "field offices" generally located at the project site.

Transportation Commission

The five member Transportation Commission is a quasi-judicial board administratively attached to the MDT. Members are appointed by the governor and are responsible for establishing highway construction priorities and selecting statewide projects. All construction contracts must be awarded by the commission. If changes are needed in the contract after it is awarded and construction is under way, commission approval is needed.

Federal Highway Administration (FHWA)

Federal-aid transportation program management is the responsibility of the FHWA. The Montana division of FHWA has entered into a partnership agreement with MDT to establish methods for assuring compliance with state and federal laws and regulations. The FHWA must approve major contract changes, extra work orders, and other contract modifications for most federally funded projects. In addition, FHWA staff periodically inspect projects and attend related project meetings. MDT project information related to quality of work and contract administration is provided to FHWA on an on-going basis.

Chapter III - Management Controls Over the CCA Process

Introduction

The first step of our review was to examine management controls in place over the Construction Contract Administration (CCA) process administered by MDT. Our review focused on several key areas within the overall CCA process. These areas included the controls over the measurement and payment of contract items and procedures for ensuring projects meet standard specifications. The following sections outline our findings in these areas.

Controls Over Measurement and Payments of Contract Quantities

One of the major areas of the CCA process is controlling measurement and payment of contract quantities, as prescribed in section 109 of the Standard Specifications and applicable department policies. Guidelines require all contract pay items to have data to support payment to contractors and should include all pertinent information relating to method of measurement, dates of installation, names of survey crew, inspector, recorder, tester, etc. The project manager is responsible for assuring these records are accurately maintained. Department policy requires all pay quantity documentation to be clear, concise, and easily followed and understood by personnel unfamiliar with the project. To test this area, we examined the internal controls system set up to assure payments were accurate and complete. This involved examining procedures completed by the Contractor Estimates section in the Construction Bureau, reviewing progress estimates and supporting documentation for sampled projects, interviewing project staff, and interviewing district office engineers.

Field and District Staff Responsibilities

Project documentation in field offices includes supporting documentation for all related CCA activities. Field inspectors generate diaries to document daily quantities and types of activities completed. Contractor invoices, truck haul tickets, and other quantity documentation are included in each CCA file. Progress estimates are generated monthly and include supporting documentation for any changes such as change orders or new payment items. Each project has a field office person who maintains all documentation and examines consistency with office procedures and accuracy of all calculations. These reviews are completed on a daily or weekly basis. After that review, all project documentation

is sent to office engineers in the district office for the next level of desk auditing prior to submission to Helena for final review.

During our review, we compared project documentation at each level of this process to required specifications and polices outlined in the MDT Construction Manual. We did not note any control weaknesses or areas lacking controls at this level. There is a segregation of duties between field crew staff and between the field and district staff. Established procedures are in place and were followed. A system of controls, in the form of independent review of all calculations and supporting documentation, has been developed and is followed by district staff.

Construction Bureau Duties

The Contractor Estimates section within the Construction Bureau is responsible for processing, reviewing and desk auditing payments to contractors. To manage this workload, there are two payment cycles every month. Two districts submit payment estimates on the first of each month, and the three other districts submit estimates on the fifteenth. All payments are considered estimated payments until the final review of submitted project documentation is "desk-audited" by staff in this section. The focus of bureau reviews is to check math calculations and cross reference quantity amounts with contract prices and total "estimated" payments made to date. Any overruns or underruns of 25 percent or more on any materials or activities are highlighted. Before final payment is made, section staff also check to see if any other fines or payments are owed by the contractor to the Civil Rights section, Motor Carrier Services, etc. Any amount owed is deducted from final payment. We observed each step of this process and examined supporting documentation for each procedure. We did not note any control weaknesses or areas lacking controls at this level.

Conclusion: Controls Over Measurement and Payment are in Place

Based on our work in this area, we conclude there are adequate controls over the payment and measurement process for CCA activities. There are established procedures for staff to follow, supporting documentation is developed for all contract items, and key areas within the process have independent supervisory review. These controls provide assurance the process is consistent statewide.

Are Methods in Place to Ensure Projects Meet Standards?

One of the main concerns raised by department management during audit planning was whether each district is following the same construction standards. As noted in Chapter II of this report, there are designated Standard Specifications developed by MDT to outline the expected quality of construction for highway projects. The specifications are to be applied to all CCA contracts across the state and should be consistently followed by all MDT staff and contractors. Initial interviews with department management personnel and contractors indicated these specifications may not be followed consistently. To examine potential inconsistencies, we interviewed staff in all five districts relative to CCA operations. In addition, we examined project files in field offices and district offices to highlight any areas of inconsistency. A sample of contractors were interviewed to obtain their input, as well as staff from the Montana Contractors' Association. The following sections outline our findings in this area.

District Quality Control Measures

Quality control methods at the district level include supervisory review by district construction supervisors and project documentation reviews by office engineers. These reviews are required by MDT policy to formally establish a quality control system. District construction supervisors indicated they focus on technical issues and engineering decisions made by field staff. As noted earlier, we found desk audits are completed on all project documentation by office engineers as required. Both of these reviews are designed to ensure projects meet the Standard Specifications and department policies. In the 25 files reviewed, we found project documentation was consistent with major department policies and included evidence of the required supervisory review.

Construction Bureau Quality Control Measures

Quality control measures at the bureau level include periodic on-site inspections by Construction Bureau construction reviewers, on-going review of quality assurance testing, and review of various key paperwork processes. The main focus of the construction reviewers is on the quality control function. They are responsible for communicating methods or concerns between project staff and districts. Overall we found the reviewers provide a system for ensuring statewide consistency. Quality control information on materials and construction activities is monitored on an on-going

basis. Major contract changes are discussed with bureau management personnel. FHWA approval is required on major changes on most federally funded projects. No major control weaknesses were identified.

Conclusion: Quality Control Procedures are in Place

The department has established a formal quality control system for monitoring compliance with its Standard Specifications. We found various controls are in place and are working to ensure statewide consistency with designated standards.

Areas Where Controls Could be Strengthened

While we found controls were working, we identified areas where the existing management controls could be strengthened to improve CCA communications and process efficiencies. These areas include evaluating management staff and developing a field office manual.

Evaluations of Management Staff

A management evaluation process is key for de-centralized operations to promote communications and ensure consistency. However, periodic evaluations and performance appraisals are not conducted on CCA management staff. Evaluations have not been consistently conducted for all district administrators, district construction supervisors, and central office CCA management staff.

Key performance areas need to be evaluated in order to determine how well management staff are functioning in such areas as goal-setting, delegation of authority, review of subordinates work, and effective decision-making. To achieve improved levels of performance, department managers must make judgements about the desired quality of job performance. These judgments should be made using all available performance indicators. Evaluating performance indicators should include input from the Chief Engineer, due to his responsibility for reviewing technical issues.

Recommendation #1
We recommend the department periodically evaluate CCA managers' performance.

Field Office Manual

Staff interviews indicated frustration with current process manuals because they do not provide specific direction in conducting field office duties. To address staff concerns, the Missoula district developed another manual, the Field Office Manual, to outline required steps for completing office work and submitting reports to the Construction Bureau. This manual has summarized information from various sources (manuals, guidelines, policy memos) to help direct staff in their activities. Our review of this manual found it was complete and provides guidance to staff. Providing this manual to all staff would provide direction to staff conducting field office duties.

Recommendation #2

We recommend the department develop a formal field office manual for district staff to use in the CCA process.

Summary

Our tests showed reliable controls are in place and are consistently applied for administering the construction contracts. The department has developed a formal system of procedures and established sound internal controls over key CCA processes. We did not document any major inconsistencies with designated standards and policies. We found staff are generally aware of the required procedures and follow these guidelines. Staff interviews indicated a high level of professionalism and pride in producing a quality product. Constructing a highway or bridge which meets established standards was a high priority for all staff contacted.

Chapter IV - CCA Project Management

Introduction

Our next audit objective was to examine the efficiency of project management and identify any unnecessary steps. Audit testing focused on reviewing project documentation in all five districts, the central office, and in field offices. Twenty-five projects, three to seven files per district, were reviewed to ensure a statewide sample was examined. Projects reviewed included highway construction projects of various size and dollar amounts and at different stages of completion. In addition, we observed various construction activities including hot plant operations, paving, grading materials, storm water management, bridge construction, and quality control testing. Various field personnel were interviewed and observed including project managers, field inspectors, and hot plant inspectors. The following sections discuss areas where process improvements could be made without weakening the established control system.

Documentation Requirements

The department has gradually changed its system for documenting CCA activities from "pencil and paper" to electronic data processing on computers. For example, excavation quantities that were once calculated by hand can now be calculated electronically. While electronic systems have helped simplify how the department documents CCA activities, we found the department has retained some of the paperwork documentation from the pencil and paper processing system. Some required documentation appears to duplicate other information compiled elsewhere or may be unnecessary to meet current reporting requirements. Some examples include:

-- Duplicated reporting requirements for project manager diaries.
-- Materials lab/field sample reports with overlapping information.
-- Mileage comparison forms which are no longer used.
-- Bridge forms with duplicate information in different formats.
-- Fuel price adjustment forms which create extensive paperwork.

By addressing these duplicated paperwork procedures, the department could streamline the process.

Recommendation #3
We recommend the department eliminate unnecessary paperwork in the CCA process by revising various paperwork processes currently used.

Partnering Process

In response to a national quality initiative, the department developed a partnering process designed to formalize communications with contractors and make decisions at the lowest project staff level possible to help get issues resolved in a timely manner. Although the Montana CCA process did not historically have problems in this area, MDT did adopt the partnering process into the Standard Specifications.

The first step in the partnering process is to resolve problems at the project manager level. If this is not possible, then problems are discussed with district construction supervisors and district administrators. If district management cannot settle the issue, it is then taken to the Helena Central Office for final resolution. The decision of whether to follow the formal partnering process on any particular project is left up to the contractor. In Montana there has been limited use of the partnering process. Only about 6 percent of construction projects were partnered in calendar years 1995 and 1996.

Both staff and contractors noted the partnering process has not been working as intended and has added confusion over where decisions should be made. We found no negative impact on projects where partnering was not followed and in some cases having the option to address disagreements at a higher level created a disincentive to working out proposed changes at the project level. Partnering has also resulted in higher CCA costs. During calendar years 1995 and 1996, partnering workshops cost $63,472. This does not include staff time for attending these conferences.

Under the current control system, the partnering system does not work. The designed system does not correspond with existing controls and does not achieve its intended purpose. The department

should evaluate the purpose and need for the partnering process to ensure designated procedures correspond with the existing CCA control system.

Recommendation #4
We recommend the department evaluate the purpose and the need for the formal partnering process.

Change Order Procedures

Change orders are modifications to construction contracts which reflect conditions not anticipated during the project's planning process. They can occur for a number of reasons and generally reflect "major changes" to contract requirements for a project. Each district is delegated authority from the Engineering Division and the Construction Bureau to approve change orders up to certain dollar limits. The process to approve change orders involves several steps; discussions and negotiations between the department, the contractor, FHWA officials as well as numerous transfers (electronic and paper) of information between the Construction Bureau and district personnel.

After reviewing 57 change orders, we found a contributing factor to this confusing process is the inconsistency between MDT's policy for delegating change order approval and the actual procedures for processing change orders. Even though districts are authorized to approve certain change orders, the computer system to process them has edits in place which do not allow district personnel to process change orders within their approval authority. The change order process has created confusion among district and central office staff over where change order decisions and approval should take place. The way the system has evolved, it appears the department has not decided if delegated authority for change orders to the districts is appropriate.

To improve communications and clarify change order processing and approval, the department should either eliminate delegated authority or fully implement current policy by adapting the computer system controls.

Recommendation #5
We recommend the department either:

A. Eliminate the existing change order policy which delegates authority to the district levels, or

B. Fully implement the current policy by adapting the current computer system to allow processing at the district level.

Chapter V - CCA Process and Organization

Introduction

Overall, we found the CCA process is not designed to be an efficient process. The process is based on CCA employees monitoring all contractor activities. This can result in staff inefficiencies when waiting for construction to start or waiting for contractor crews to begin various activities. Due to long distances between projects, considerable time is also spent by CCA staff traveling between projects. Because CCA employees are responsible for counting truckloads of materials or measuring depth of road base periodically, they must remain at the project site until this activity is completed. Tests conducted on pavement or compacted materials are completed after the fact. Overall, this creates a labor intensive system with a certain level of fixed operational costs. This system has extensive monitoring requirements and overlapping controls to ensure consistency and to reduce the potential risks. Eliminating or reducing any steps in this process must be weighed against any potential risks of reducing process controls. However, the current CCA process costs approximately $13 million per year to ensure the existing level of quality control. We believe the department could reduce the level of project monitoring for projects with fewer risks. This could result in reduced program costs.

Alternative Approaches to CCA

The CCA process is designed to strictly control the quality and costs of construction. This approach is a labor intensive system which does not allow for alternative approaches depending upon the type of project being constructed. Throughout the course of this audit, we found numerous examples where multiple levels of controls are in place to prevent potential abuses. For example, CCA staff are on-site monitoring contract activities and quantities all through the course of the project. Projects have three levels of review completed on all documentation including field, district and bureau reviews.

Other Contracting Systems

We compared the department's CCA process to other governmental contract monitoring systems. We found the department's system is much more extensive than most contract monitoring systems. Other control systems are designed more as a quality assurance function rather than a quality control function. For example, if the State of Montana contracts for building construction, the amount of monitoring depends on the size and complexity of the project. For regular building construction projects there is no requirement for an on-site team of state reviewers to count quantities or monitor product quality at all times. Instead contract monitoring will include periodic inspections by various building code and state officials as well as a review of the completed project. For state building contracts the responsibility for general oversight of contract activities is left up to the prime contractor. In the case of state and federal highway construction, CCA staff at MDT assume this role of general oversight.

MDT Assumes Potential Liability

When considering the level or amount of project control needed, a major consideration is who should accept liability for project quality. Due to the high degree of department oversight in the current CCA process, the accountability or potential liability of highway construction is assumed by MDT. Any future claims of poor quality construction could be blamed on inadequate supervision or monitoring by department staff rather than inappropriate construction techniques or poor construction management by the contractor. The current CCA process also results in contractors relying upon the quality assurance testing completed by department staff rather than conducting their own quality control testing. There have been instances on past highway construction projects where the contractor has filed claims stating that inadequate department monitoring resulted in project overruns and poor project quality.

CCA Approach Should Correlate to Project Risks

Good management practice dictates on-going evaluation of established processes to identify any potential efficiencies and cost savings. One possible alternative approach would be to try decreasing on-site monitoring by CCA staff for some low risk projects, such as one lift overlays or simple bridge projects. This would require shifting more quality control requirements to the contractor. A risk analysis of projects could be completed to

categorize projects which may require less on-site monitoring to document quantities and to ensure project quality. The department could take steps to assess the level of monitoring needed for each construction project to minimize risks to public safety but also achieve cost savings.

Recommendation #6
We recommend the department examine the level of construction project monitoring needed for lower risk projects.

Overall Management Decisions Needed

In order to address the issues outlined in this report some decisions will be needed relating to overall program management and lines of authority. Although the department has taken steps to address some of these areas, the recommendations outlined in this report stem from concerns over the lines of authority for various CCA activities. The key area where further decisions are needed is the role and function of the Construction Bureau.

The Current Role of the Construction Bureau

Under the current organizational structure, Construction Bureau staff operate with several disadvantages. The authority of bureau staff and their ability to address concerns out in district operations has been limited by delegating authority to district levels. On the other hand, control over key areas such as change orders is solely their responsibility. This confusing mix of oversight and technical assistance creates communication and organizational problems statewide. Although district administrators are at a higher level in the reporting structure than the Construction Bureau chief, the bureau chief position has authority over key activities performed at the district level. District staff often rely on the bureau chief to make difficult program and management decisions. As one contractor noted "districts make the easy decisions, however, if it's a tough decision . . . districts pass it to Helena." This raises questions related to the role of the bureau and the districts in the CCA process.

Does the Bureau Have Authority to Complete Their Functions?

Currently there are several functions performed by bureau staff critical to completing the CCA process:

-- Processing all progress estimates to ensure timely payments to contractors.
-- On-site monitoring of key construction activities.
-- Processing all change orders to ensure addition to the progress estimates.
-- Approval of change orders which exceed a certain dollar limit.

Overall, the main bureau function is to provide technical oversight to district personnel. Technical oversight duties include developing policies, clarifying standards, and developing staff training programs. These bureau responsibilities are critical to the stewardship agreement with FHWA as a method to ensure statewide consistency with approved construction standards.

The Construction Review Section within the Construction Bureau has five reviewers and one supervisor who provide the required assistance to district and field staff. These reviewers are responsible for visiting projects across the state and determining if construction standards are followed. However, bureau reviewers do not have authority to direct district or field staff activities.

The bureau also requires cooperation from district personnel and field staff to properly complete its duties. However, the bureau has no direct oversight authority to address any time delays resulting from inaction or lack of cooperation from district and field staff. For example, one district had several completed projects that had not been submitted for timely final payment. Some projects had been completed for six months, others had been completed for over a year. Although memos had been sent by bureau staff, there was no formal method to take corrective action to force district and field personnel to submit final payment documentation as required by CCA policy.

Organizational Structure Should Conform to CCA System in Place

The existing organizational structure does not correspond to the control and procedures established for the CCA process. Management should examine and change the organization to ensure consistency with the process. The clearer the line of authority from top management to staff, the more effective decision making and communication will be for the whole organization. Currently, district staff rely on the Construction Bureau chief to make difficult program and management decisions. Other bureau responsibilities such as policy development, staff training or clarification of standards, often go unaddressed due to other priorities. The amount of central control needed and where those functions should be performed is an area department management should address to effectively use the department's resources and to create a more efficient CCA process.

Recommendation #7

We recommend the department examine and change the role and the authority of both the Construction Bureau and the districts in the Construction Contract Administration process.

Agency Response

Montana Department
of Transportation

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March 16, 1998

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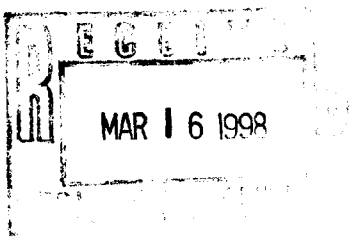

Dear Mr. Pellegrini:

The following is our response to the Construction Contract Administration Performance Audit.

Recommendation #1
We recommend the department periodically evaluate CCA managers' performance

Response to Recommendation #1
We concur. The Department will initiate an evaluation process of the CCA managers within 6 months.

Recommendation #2
We recommend the department develop a formal field office manual for district staff to use in the CCA process.

Response to Recommendation #2
We concur. We expect the field office manual to be in place and distributed within 6 months.

Recommendation #3
We recommend the department eliminate unnecessary paperwork in the CCA process by revising various paperwork processes currently used.

Response to Recommendation #3
We concur. We will review the paperwork process and eliminate any areas where duplication, obsolescence, or necessity will allow a streamlining of the process. We will revise necessary paperwork to further streamline the process.

Recommendation #4
We recommend the department evaluate the purpose and the need for the formal partnering process.

Response to Recommendation #4
We concur. The formal partnering process will be rescinded from the specifications as soon as possible. An evaluation of the benefits of partnering and how they relate to MDT will be done. Based on the results of this evaluation, action will be taken accordingly.

Recommendation #5
We recommend the department either:

A. Eliminate the existing change order policy which delegates authority to the district levels or

B. Fully implement the current policy by adapting the current computer system to allow processing at the district level.

Response to Recommendation #5
We concur. We will investigate adopting the computer system controls to fully implement the change order policy. The change order policy will be reviewed and modified based on various other decisions which have an effect on the delegated authority, i.e., partnering, FHWA Stewardship agreement, organizational structure, etc.

Recommendation #6
We recommend the department examine the level of construction project monitoring needed for lower risk projects.

Response to Recommendation #6
We concur. Discussions have been started to evaluate the level of monitoring and oversight on various project types, including lower risk projects. These will continue. The ultimate results must consider input relative to federal regulations, cost efficiency, liability, and quality.

Recommendation #7
We recommend the department examine and change the role and the authority of both the Construction Bureau and the districts in the Construction Contract Administration process.

Response to Recommendation #7
We concur. The authority and roles of the Construction Bureau and the districts in the CCA process will be examined. This examination must consider organizational structure, overall program

management, lines of authority and the future direction of the Department.

We appreciate the cooperation and professionalism exhibited by your staff in conducting this audit. If you have any questions, please feel free to call on myself or our staff.

Sincerely,

Marv Dye, Director

MD:GAG:c